

WHAT IS CLAIMED IS:

1. An inorganic oxide expressed by a chemical formula I  
$$MLn_2QR_4O_{12} \quad (I)$$

5        where M is at least one element selected from the group consisting of Mg, Ca, Sr, and Ba;  
         L<sub>n</sub> is at least one rare earth element selected from the group consisting of Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;  
10        Q is at least one element selected from the group consisting of Si, Ge, Sn, and Pb; and  
         R is at least one element selected from the group consisting of B, Al, Ga, In, and Tl.
- 15    2. The inorganic oxide according to claim 1, wherein the L<sub>n</sub> is at least one rare earth element selected from the group consisting of Sc, Y, La and Gd, the Q is at least one element selected from the group consisting of Si and Ge, and the R is at least one element selected from the group consisting of B, Al and Ga.
- 20    3. The inorganic oxide according to claim 2, wherein the majority of the L<sub>n</sub> is made up of Y.
- 25    4. The inorganic oxide according to claim 2, wherein the majority of the Q is made up of Si.
5. The inorganic oxide according to claim 2, wherein the majority of the R is made up of at least one selected from Al and Ga.
- 30    6. The inorganic oxide according to claim 1, wherein the inorganic oxide has a garnet crystal structure.
7. The inorganic oxide according to claim 1, wherein the inorganic oxide further comprises at least one rare earth element selected from the group  
35    consisting of Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.
8. The inorganic oxide according to claim 1, which is a solid solution in

which an inorganic oxide expressed by a chemical formula II below is doped into the inorganic oxide expressed by the chemical formula I

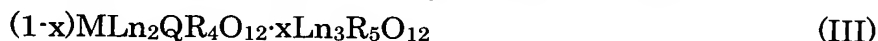


5 where R is at least one element selected from the group consisting of B, Al, Ga, In, and Tl.

9. The inorganic oxide according to claim 8, wherein a ratio of the inorganic oxide expressed by the chemical formula I and the inorganic oxide expressed by the chemical formula II is I : II = 1:99 to 99:1 in weight ratio.

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10. An inorganic oxide expressed by a chemical formula III



where M is at least one element selected from the group consisting of Mg, Ca, Sr, and Ba;

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Ln is at least one rare earth element selected from the group consisting of Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

Q is at least one element selected from the group consisting of Si, Ge, Sn, and Pb;

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R is at least one element selected from the group consisting of B, Al, Ga, In, and Tl; and

x is in a range of  $0 < x \leq 0.98$ .

11. The inorganic oxide according to claim 10, wherein the range of x is  $0 < x \leq 0.9$ .

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12. The inorganic oxide according to claim 11, wherein the range of x is  $0 < x \leq 0.7$ .

13. The inorganic oxide according to claim 12, wherein the range of x is  $0 < x \leq 0.5$ .

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14. The inorganic oxide according to claim 10, wherein the Ln is at least one rare earth element selected from the group consisting of Sc, Y, La and Gd, the Q is at least one element selected from the group consisting of Si and Ge, and the R is at least one element selected from the group consisting of B, Al and Ga.

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15. The inorganic oxide according to claim 14, wherein the majority of the Ln is made up of Y.
- 5 16. The inorganic oxide according to claim 14, wherein the majority of the Q is made up of Si.
17. The inorganic oxide according to claim 14, wherein the majority of the R is made up of at least one selected from Al and Ga.
- 10 18. The inorganic oxide according to claim 10, wherein the inorganic oxide has a garnet crystal structure.
- 15 19. The inorganic oxide according to claim 10, wherein the inorganic oxide further comprises at least one rare earth element selected from the group consisting of Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.
20. A phosphor having an inorganic oxide expressed by a chemical formula I as a phosphor host or an active component
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$$MLn_2QR_4O_{12} \quad (I)$$
- where M is at least one element selected from the group consisting of Mg, Ca, Sr, and Ba;
- Ln is at least one rare earth element selected from the group consisting of Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and
- 25 Lu;
- Q is at least one element selected from the group consisting of Si, Ge, Sn, and Pb; and
- R is at least one element selected from the group consisting of B, Al, Ga, In, and Tl.
- 30 21. The phosphor according to claim 20, further comprising at least one selected from the group consisting of  $Ce^{3+}$  ions,  $Pr^{3+}$  ions,  $Eu^{3+}$  ions, and  $Tb^{3+}$  ions as a luminescent center of the phosphor.
- 35 22. The phosphor according to claim 20, which is a solid solution in which an inorganic oxide expressed by a chemical formula II below is doped into the inorganic oxide expressed by the chemical formula I

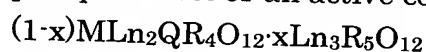


(II)

where R is at least one element selected from the group consisting of B, Al, Ga, In, and Tl.

- 5 23. The phosphor according to claim 22, wherein a ratio of the inorganic oxide expressed by the chemical formula I and the inorganic oxide expressed by the chemical formula II is I : II = 1:99 to 99:1 in weight ratio.

- 10 24. A phosphor having an inorganic oxide expressed by a chemical formula III as a phosphor host or an active component



(III)

where M is at least one element selected from the group consisting of Mg, Ca, Sr, and Ba;

- 15 Ln is at least one rare earth element selected from the group consisting of Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

Q is at least one element selected from the group consisting of Si, Ge, Sn, and Pb;

- 20 R is at least one element selected from the group consisting of B, Al, Ga, In, and Tl; and

x is in a range of  $0 < x \leq 0.98$ .

- 25 25. The phosphor according to claim 24, further comprising at least one selected from the group consisting of  $\text{Ce}^{3+}$  ions,  $\text{Pr}^{3+}$  ions,  $\text{Eu}^{3+}$  ions, and  $\text{Tb}^{3+}$  ions as a luminescent center of the phosphor.